

**WHAT IS CLAIMED IS:**

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- 5      1. A thermo-sensitive heater comprising:  
      a tubular coating layer with electric insulating characteristics;  
      a tubular thermistor disposed in the coating layer, having inner and outer surfaces;  
      a cord-shaped heating element disposed in the thermistor, having inner and outer  
      surfaces;  
      a center core structure disposed in the form of a wire in the cord-shaped heating element;  
      a shielding coil connected to a current supplying terminal and disposed in the form of a  
10     winding wire around the outer surface of the thermistor;  
      a first heating coil disposed in the form of a winding wire around the outer surface of the  
      cord-shaped heating element, thus contacting the inner surface of the thermistor; and  
      a second heating coil disposed in the form of a winding wire around the center core  
      structure, contacting the inner surface of the cord-shaped heating element.
- 15     2. The thermo-sensitive heater as set forth in claim 1, wherein the first and second heating  
      coils are connected in series to form a temperature detecting terminal.
- 20     3. The thermo-sensitive heater as set forth in claim 1, wherein the thermistor is formed on  
      an outer surface of the cord-shaped heating element through an extrusion forming process.
- 25     4. The thermo-sensitive heater as set forth in claim 1, wherein the tubular coating layer  
      comprises polyvinyl chloride.
5. The thermo-sensitive heater as set forth in claim 1, wherein the thermistor comprises a  
nylon resin.
6. The thermo-sensitive heater as set forth in claim 1, wherein the shielding coil comprises  
rolled copper wire that is formed by compressing a copper wire, and radiates electromagnetic

waves radiated from the cord-shaped heating element to a neutral terminal of an AC voltage during a heating cycle.

7. The thermo-sensitive heater as set forth in claim 1, wherein the outer surface of the cord-shaped heating element comprises silicon rubber.

8. The thermo-sensitive heater as set forth in claim 1, wherein the center core structure comprises polyester filament yarn.

10 9. The thermo-sensitive heater as set forth in claim 1, wherein the first and second heating coils comprise rolled copper wire that are formed by compressing copper wires.

10. The thermo-sensitive heater as set forth in claim 1, further comprising:

a diode arranged between a terminal and the cord-shaped heating element such that an operation cycle of the AC voltage supplied to the terminal and a neutral terminal is divided into a heating cycle with a positive AC voltage applied to the cord-shaped heating element through the terminal, and a temperature detecting cycle with the positive AC voltage applied to the current supplying terminal through the neutral terminal;

20 a heating resistor arranged parallel to the diode for inducing a temperature voltage left in the nylon thermistor to the temperature detecting terminal during a temperature detecting cycle; and

a temperature controller for detecting a voltage, outputted between opposite sides of the heating resistor, through the temperature detecting terminal during the temperature detecting cycle, and switching on/off the driving current for the cord-shaped heating element.

25 11. The heater as set forth in claim 9, wherein the temperature controller includes:  
an SCR arranged between the first heating coil and the neutral terminal so as to switch on/off the driving current for the first and second heating coils which is applied through the terminal;

a temperature fuse connected to the heating resistor and arranged on a side of a terminal for supplying a driving current for the cord-shaped heating element such that the fuse is cut if the heating temperature of the heating resistor rises excessively;

5 a temperature detector for detecting a temperature voltage applied between the heating resistor and the second heating coil during the temperature detecting cycle and maintaining the detected temperature voltage until the next temperature detecting cycle;

a temperature setting unit for setting the heating temperature of the thermo-sensitive heater by a variable resistor and at the same time, operating in conjunction with a switch for switching on/off the driving current;

10 a temperature comparator for comparing a temperature detected by the temperature detector and a temperature preset by the temperature setting unit, and outputting a "high" signal if the detected temperature is lower than the preset temperature and a "low" signal if the detected temperature is higher than the preset temperature;

15 a zero detector for generating a "high" signal for a predetermined period of time on the basis of the time when the voltage at the neutral terminal is 0V, and generating a "low" signal for the remaining time of the cycle;

a disconnection detector connected to the other side of the shielding coil for generating a "high" signal if the shielding coil is not disconnected, and generating a "low" signal if the shielding coil is disconnected;

20 an AND gate for logically combining the output signals from the zero detector, the temperature comparator and the disconnection detector, and outputting the combined signal to a driving unit; and

a driving unit for receiving and amplifying the output of the combined signals from the AND gate and providing the amplified current to the SCR as a gate current.

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12. A thermo-sensitive heater comprising:
- a tubular coating layer with electric insulating characteristics;
  - a tubular electrical insulation layer disposed in the coating layer, having inner and outer surfaces;

a tubular first layer disposed in the electrical insulation layer, having inner and outer surfaces;

a cord-shaped heating element disposed in the first layer, having inner and outer surfaces;

a core wire disposed in the form of a wire in the cord-shaped heating element;

5 a first electrode disposed around the outer surface of the cord-shaped heating element and connected to a driving current connection terminal, thus contacting the inner surface of the first layer, for applying a temperature measuring current to the first layer, and for use as a heating element of the cord-shaped heating element;

10 a second electrode disposed around the first layer, thus contacting the inner surface of the electrical insulation layer, for detecting an electric resistance value of the first layer, which is varied according to the temperature variation of the cord-shaped heating element; and

15 a first heating coil disposed around the core wire and connected to a driving current connection terminal.

13. The thermo-sensitive heater as set forth in claim 11, wherein the first heating coil and the  
first electrode are connected in series to form a temperature detecting terminal.

14. The thermo-sensitive heater as set forth in claim 11, wherein a first shielding coil is disposed in the form of a winding wire around the outer surface of the electrical insulation layer  
20 for discharging an electric field radiated from the cord-shaped heating element to an external electric field and comprises rolled copper wire that is formed by compressing a copper wire.

15. The thermo-sensitive heater as set forth in claim 11, wherein the first electrode is a winding wire arranged to coil around the outer surface of the cord-shaped heating element and  
25 comprises rolled copper wire that is formed by compressing a copper wire.

16. The thermo-sensitive heater as set forth in claim 11, wherein the second electrode is a winding wire arranged to coil around the nylon layer and comprises rolled copper wire that is formed by compressing a copper wire.

17. The thermo-sensitive heater as set forth in claim 11, wherein the first heating coil is a winding wire arranged to coil around the electric insulation core wire and comprises rolled copper wire that is formed by compressing a copper wire.

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18. The thermo-sensitive heater as set forth in claim 11, wherein the core wire comprises glass fiber wire.

19. The thermo-sensitive heater as set forth in claim 11, wherein the electrical insulation  
10 layer comprises silicon rubber.

20. The thermo-sensitive heater as set forth in claim 11, wherein the first layer is composed  
of a nylon resin.

15 21. The thermo-sensitive heater as set forth in claim 11, wherein the outer surface of the  
cord-shaped heating element comprises rubber.

22. The thermo-sensitive heater as set forth in claim 11, wherein the tubular coating layer  
comprises polyvinyl chloride.

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23. The thermo-sensitive heater as set forth in claim 11, wherein the first electrode is  
disposed in the form of a wire mesh surrounding the outer surface of the cord-shaped heating  
element.

25 24. The thermo-sensitive heater as set forth in claim 11, wherein the second electrode is  
disposed in the form of a wire mesh surrounding the first layer.

25. The thermo-sensitive heater as set forth in claim 11, wherein the first heating coil is  
disposed as a plurality of wires winding wire surrounding the core wire.

26. The thermo-sensitive heater as set forth in claim 11, wherein the cord-shaped heating element is a non-magnetic heating element;

the first electrode is used as a second heating coil; and

5 the second electrode is used as a second shielding coil.